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10/584,352	06/23/2006	Takashi Kikuchi	062688	3355
38834 7590 12/19/2007 WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036				
EXAMINER				
SLAWSKI, BRIAN R				
ART UNIT		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/584,352

Applicant(s)

KIKUCHI ET AL.

Examiner

Brian R. Slawski

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____
- Paper No(s)/Mail Date 06/23/2006, 11/27/2006

METHOD OF MANUFACTURING FLEXIBLE LAMINATE SUBSTRATE

Examiner: Slawski S.N.: 10/584,352 Art Unit: 4191

December 5, 2007

Claim Rejections – 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hase et al. (WO01/32418) in view of Kerr et al. (US 5,478,434). (Subsequent references to Hase et al. WO01/32418 are based on the corresponding U.S. Patent No. 7,101,455.)

Regarding Claim 1, Hase et al. teach a method of producing a laminate suitable for a flexible circuit board (see Abstract). The laminate **6** includes copper foils **1** bonded onto at least one surface of a heat-resistant polyimide adhesive film **2**. The laminate is thermally bonded via a protective film **3** between one or more pairs of metal rolls, after which the protective film is peeled off (see Fig. 1(a); col. 1, L. 25-31; col. 2, L. 8-19; col. 8, L. 16-28). However, Hase et al. do not specifically teach such a method in which greater tension is applied to the laminate during the delamination of the protective film than after the passage between the metal rolls.

Kerr et al. teach a method of laminating a plurality of webs comprising a receiver stock **24**, a carrier sheet **22**, and, on the side of the carrier facing the receiver stock, a material such as color donor to be applied to the receiver stock (see Fig. 2; col. 3, L. 25-

35). Said webs advance through the nip between heated pressure lamination rollers **16** and **18** and are laminated therein, the carrier transferring its color donor to the receiver stock (col. 3, L. 52-59). The bonded webs then pass a stripper bar **40** above the carrier sheet and some distance from the lamination rollers (Fig. 8; col. 4, L. 20-27). The carrier web, attached to a de-lamination leader **28**, is finally diverted to a pair of driven nip rollers **30** and **32** that tension the carrier sharply around the stripper bar to strip the carrier from the laminate (col. 4, L. 9-18; Claim 1). Thus, Kerr et al. teach greater tension on the laminate during delamination than after the passage between the lamination rollers. Kerr et al. teach that this process allows the carrier to be cleanly separated from the carrier stock (col. 4, L. 16-18) after allowing time for the sandwich to cool to the preferred temperature for delamination (Claim 1).

Therefore, it would have been obvious to one having ordinary skill in the art to apply onto the bonding method of Hase et al. the use of greater tension on the laminate during delamination of the protective film than after the passage between the metal rolls, because Kerr et al. teach that such an increase of tension enables clean and stable separation of the waste film following lamination and appropriate cooling.

Regarding Claim 3, Hase et al. do not specifically teach a tension on the laminate from 10 N/m to 200 N/m inclusive after the passage between the metal rolls. Hase et al. do, however, teach that the tension during the adhesion process can cause distortion of the laminate due to different rates of expansion of the copper foil and the polyimide film, and that said tension is therefore preferably reduced to the minimum needed for the materials to stably proceed straight ahead (col. 3, L. 11-31, 39-42). Hase et al. further

teach that this wrinkling tendency of the laminate varies according to the thickness of the copper foils chosen (col. 13, L. 36-41). Therefore, it would have been within the skill of the ordinary artisan to adjust the tension applied during lamination in the method of Hase et al., according to the materials selected, to achieve satisfactory adhesion without wrinkling of the laminate. Discovery of the optimum value of a result-effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, CCPA 1980, 617 F.2d 272, 205 USPQ215.

Regarding Claim 5, Hase et al. teach that it is preferable to bring the temperature of the laminate below the glass transition temperature of the thermoplastic resin adhesive film before peeling the protective film, as the protective film does not peel off easily at high temperature. Hase et al. teach that it is most preferable to peel the protective film from the laminate at room temperature (col. 11, L. 9-20).

Regarding Claim 6, Hase et al. teach the use of a protective polyimide film that is non-thermoplastic (col. 4, L. 66-67; col. 5, L. 1-3).

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hase et al. (WO01/32418) and Kerr et al. (US 5,478,434), as applied to Claims 1, 3, 5, and 6 above, and further in view of Freeman et al. (US 5,366,582).

Hase et al. in view of Kerr et al. teach a method of producing a flexible laminate substrate as described in paragraph 2 above, but do not define the preferred tension during delamination.

Freeman et al. teach a method of delaminating labels **12** from a web **10** by applying tension to the web by means of a pull tractor **30** (see Fig. 3; col. 2, L. 47-51). Freeman et al. do not specifically teach a tension applied to the laminate during delamination from 50 N/m to 500 N/m inclusive. However, Freeman et al. recognize that the tension applied to web **10** by pull tractor **30** is important in causing separation of the labels from web **10**. Freeman et al. recognize that "variations in the adhesive force between the labels and the release liner, and/or in the stiffness of the labels, may affect the combination of separation angle, radius of separation edge, and tension applied to the web that are required for satisfactory separation of the labels." (col. 2, L. 61-68; col. 3, L. 1-3) Therefore, it would have been within the skill of the ordinary artisan to adjust the tension applied during delamination in the method of Hase et al. and Kerr et al., according to the laminate's bond strength and materials, to produce an effective separation. Discovery of the optimum value of a result-effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, CCPA 1980, 617 F.2d 272, 205 USPQ215.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hase et al. (WO01/32418) and Kerr et al. (US 5,478,434) as applied to Claims 1, 3, 5, and 6 above, and further in view of Yamamoto et al. (US 4,865,675).

Hase et al. do not explicitly teach a method wherein the tension after the passage between the metal rolls and before delamination is regulated using nip rolls, but do teach an embodiment in which the laminate passes through multiple pairs of nip

rolls **4a** before delamination of the protective film (Fig. 4; col. 14, L. 56-65). Hase et al. further teach that distortion of the laminate can occur during the laminating process due to different rates of thermal expansion of the copper foil and the polyimide film (col. 3, L. 11-31).

Yamamoto et al. teach a method of laminating a plurality of webs in the nip between hot press rollers **R1**, wherein, similarly, different rates of thermal expansion of the webs can cause curl or wrinkling of the laminate (see Fig. 1; col. 2, L. 21-28; L. 38-40). Yamamoto et al. teach that this wrinkling can be avoided by passing the laminate back and forth between the hot press rollers via delivery rollers **R2** and **R3**, where the circumferential speeds of the pairs of rollers are regulated so as to keep tension on the laminate (col. 3, L. 16-37). Thus it would have obvious to one having ordinary skill in the art to modify the method taught by Hase et al. and Kerr et al. to use nip rolls, because Yamamoto et al. teach that nip rolls are an effective means of regulating tension of the laminate to avoid wrinkling after passage between the laminating rolls.

Conclusion

5. The following prior art is made of record: Fukada (US 2002/0108709 A1) teaches a method of delaminating waste material from a laminate ([0003]). Fukada teaches that tension must be applied to the laminate during the peeling process to enable the waste matrix to be stably separated ([0008]). Maeda et al. (US 6,179,947) teach a method of forming a laminate for printed circuit boards, including copper foils continuously drawn by winding upon reels (Fig. 1; col. 1, L. 18-24; col. 3, L. 17-30). Maeda et al. teach that

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this controlled drawing maintains appropriate tension on the copper foils, which may wrinkle or tear if the tension is excessive (col. 2, L. 34-45; col. 3, L. 31-37).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian R. Slawski whose telephone number is (571) 270-3855. The examiner can normally be reached on Monday to Thursday, 7:30 a.m. to 5:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan, can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brian R. Slawski/
Examiner, Art Unit 4191

BRS

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/Dah-Wei D. Yuan/

Supervisory Patent Examiner, Art Unit 4191